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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/589,434	08/15/2006	Masataka Ota	128891	9428

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EXAMINER	
LEE, CYNTHIA K	

ART UNIT	PAPER NUMBER
1726	

NOTIFICATION DATE	DELIVERY MODE
12/23/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/589,434	OTA ET AL.	
	Examiner	Art Unit	
	CYNTHIA LEE	1726	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 July 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/26/2010 has been entered.

Response to Amendment

This Office Action is responsive to the amendment filed on 7/26/2010. Claims 1-8 are pending. Applicant's arguments have been considered and are persuasive. Claims 1-8 are non-finally rejected for reasons stated herein below.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear as to how the fuel cell can serve as a first electrical power supply source when it operates intermittently. For example, see pg 8, last paragraph, into pg 9 of the instant Specification:

"For example, when the power from the electricity storage device 81 is sufficient for operating the electric vehicle, the control unit 80 controls the electrical power to be supplied from the electricity storage device 81 alone, and when the power is insufficient the control unit 80 controls the electrical power to be supplied from both the electricity storage device 81 and the fuel cell system 10. In other words, the control unit 80 controls the fuel cell system 10 to operate intermittently by switching between the generation state and the generation stop state in accordance with the power required by the electric automobile, the charging state of the electricity storage device 81, the water temperature of the fuel cell 20, or the like."

In this instance, the fuel cell is not a first electrical power supply source. Clarification is required.

35 USC § 112, 6th paragraph

It is noted that the language "means for determining a risk of freezing…" and "control means that is configured to forbid intermittent operation…" in claim 6 invoke 35 USC 112, 6th paragraph. The corresponding structure can be found in the instant Specification page 11, last paragraph.

Claims Analysis

It is noted that the functional recitation "to operate intermittently by switching between a power generation state and a power generation stop state of a fuel cell, wherein it is determined whether to stop power generation operation during intermittent operation based on at least a temperature of a specific component that is external to the fuel cell and that contains moisture, from among a plurality of components constituting

the fuel cell system, and the temperature of the specific component is measured while the operation of the fuel cell system is being carried out" has been considered but was not given patentable weight because it has been held by the courts that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (BdPatApp & Inter 1987). See MPEP 2115.

It has been held by the courts that claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. In re Schreiber 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997). See MPEP 2115.

It is noted that an apparatus capable of performing the claimed function meets the functional language.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mufford (US 6186254) in view of Wheat (US 6727013.

Mufford discloses a control device that controls a fuel cell system. Mufford's fuel cell has the capabilities of operating intermittently because it has the capabilities of starting up and shutting down. See (4:35-50).

Mufford's system does not have the capability of "determin[ing] whether to stop power generation operation during intermittent operation based on at least a temperature of a specific component that is external to the fuel cell and that contains moisture, from among a plurality of components constituting the fuel cell system" because Mufford does not have a temperature measuring device on a device that contains moisture. Mufford discloses wherein each fuel cell stack is provided with temperature regulation means, including at least one heat transfer fluid inlet port and at least one heat transfer fluid outlet port to allow flow of a heat transfer fluid, hereinafter referred to as a "cooling medium" or "coolant", through the fuel cell stack. The cooling medium may be used to raise or lower the temperature of the fuel cells in the stack. The system is further provided with one or more pipes or conduits external to the fuel cell stack. The pipes or conduits define a coolant path for carrying the cooling medium, for example, water, glycol, or any other heat transfer medium, from the coolant outlet port to the coolant inlet port of the fuel cell stack (2:6-18).

Mufford teaches a water tank to regulate the fuel cell temperature, but does not teach a temperature measuring device on a device that contains moisture. Wheat discloses of measuring the temperature of the stack, the ambient temperature, and the water tank temperature to determine if heating is necessary to prevent freezing of the fuel cell (3:25-32). It would have been obvious to one of ordinary skill in the art at the

time the invention was to add a temperature measuring device on Mufford's water tank to for the benefit of preventing the fuel cell from freezing.

Mufford modified by Wheat has the capability of functioning wherein "the temperature of the specific component is measured while the operation of the fuel cell system is being carried out."

Regarding claim 2, the water tank 175 is a passage arranged on a flow path fuel fuel and oxidant 180 and 185 (fig. 1).

Regarding claim 3, the temperature of the specific component is measured directly by a temperature sensor provided corresponding to the water tank.

Regarding claim 4, the temperature of the specific component is measured indirectly based on the external air temperature because the ambient air affects the water tank temperature.

Regarding claim 5, Mufford modified by What has the capability of "determining whether to stop or not, when it is determined to not stop, the power generation state of the fuel cell system is controlled so that the measured temperature exceeds a threshold value."

Claims 6, 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pearson (US 6555989) in view of Mufford (US 6186254) and Wheat (US 6727013).

Pearson discloses a fuel cell system having a control device that controls the fuel cell system to operate intermittently by switching between a power generation state

and a power generation stop state of a fuel cell. (6:21-36) Pearson discloses when main power source 2 is operating normally and storage battery 7 is in a fully charged state, switch 51 connects main power source 2 to external load 3 (as shown). The fuel cell side of the system, including fuel cell stack 5 and reactant supply subsystem 10, is not required therefore and is off. However, the state-of-charge of battery 7 is continuously determined by charge controller 61. Information on battery voltage may be obtained from charge equalization system 71 and information on charge passed may be obtained by integrating the current measured by ammeter 59. Trickle charging may be provided to battery 7 by mains charging system 73 as per signal 67 from charge controller 61. Charge equalization system 71 may be operated continuously to equalize the state-of-charge of individual cells in battery 7.

(6:37-50) When a problem arises with main power source 2, it is detected by power detection module 76 and then run signals 79 are provided to runswitch 83 and inverter 45. Phase synchronization signal 81 is also provided to inverter 45. In turn, inverter 45 sends signal 53 to operate switch 51 such that power is directed from storage battery 7, through inverter 45, to external load 3. When runswitch 83 receives a run signal from either signal 79 or 85, it sends a run signal 30 to reactant supply subsystem 10. Subsystem 10 then goes through a warm up sequence and starts to supply processed reactants to fuel cell stack 5. The power needed to operate subsystem 10 and certain other devices may also be obtained from battery 7 or inverter 45 but is not shown in the schematic of FIG. 1.

(6:51-58) The demand on the fuel cell side of the system is determined by summing the current demanded from external load 3 and the current required to appropriately recharge storage battery 7. These currents are measured by load ammeter 57 and battery ammeter 59 respectively with representative signals 67 and 69 being sent to computing unit 63. Signal 31, representing the summed current, is then provided to reactant supply subsystem 10.

(6:59-65) Subsystem 10 then is directed to process and provide reactants to meet the demand represented by signal 31. However, there is a delay in the time it takes for compressor 18 and particularly for reformer subsystem 16 to produce the desired reactants. Flowmeter 20 therefore determines the actual production rate of hydrogen and, from that, a desired current to be drawn from fuel cell stack 5 (provided by signal 23 to a setpoint input of DC-DC current converter 21).

(7:36-38) Once battery 7 is fully charged, the fuel cell side of the system is signaled to shutdown.

Pearson does not disclose control means that is configured to forbid intermittent operation when it is determined that the risk of freezing is high, wherein the means for determining determines the risk of freezing while the operation of the fuel cell system is being carried out. Mufford teaches a resistor that functions as a block heater that prevents the fuel cell stack from freezing and facilitates start-up in cold weather. Fuel cell power from the fuel cell stack may also be used to supply electricity to the resistor. Fuel cell power may be advantageously used to power the resistor soon after start-up to bring the cell stack within the preferred operating temperature range and during

operating to improve fuel cell performance by maintaining the fuel cell stack within the preferred temperature range especially when the motor vehicle is operated in cool ambient temperatures (4:35-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a resistor to Pearson's fuel cell and continue to operate the fuel cell should the ambient temperature be cool ambient temperatures, as taught by Mufford, for the benefit of preventing the fuel cell from getting too cold and freezing.

Pearson modified by Mufford does not disclose a means for determining a risk of freezing of a specific component that is external to the fuel cell and that contains moisture, from among a plurality of components constituting the fuel cell system. Mufford teaches water as a cooling medium to regulate the fuel cell temperature (2:5-20). Mufford has a water tank 175 (fig. 1). Wheat discloses of measuring the temperature of the stack, the ambient temperature, and the water tank temperature to determine if heating is necessary to prevent freezing of the fuel cell (3:25-32). It would have been obvious to one of ordinary skill in the art at the time the invention was add Mufford's water tank to Pearson's fuel cell system to regulate the temperature of the fuel cell stack. It would have been obvious to one of ordinary skill in the art at the time the invention was made to measure the temperature of the water tank, as taught by Wheat, to heat the fuel cell stack for the benefit of preventing freezing.

Regarding claim 7, Pearson discloses a fuel cell which serves as a first electrical power supply source to a consumption device which consumes electrical power;

an electricity storage device that stores electrical power generated by the fuel cell, which serves as a second electrical power supply source to the consumption device which consumes electrical power (4:11-14).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pearson (US 6555989) in view of Mufford (US 6186254) and Wheat (US 6727013) as applied to claim 7, further in view of Iwasaki (US 6497972).

Pearson modified by Mufford and Wheat teaches all the elements of claim 7 and are incorporated herein. Pearson modified by Mufford and Wheat does not teach a fuel cell hybrid vehicle. Iwasaki teaches a hybrid vehicle wherein a battery 45 accumulates electric power generated by the fuel cell 29. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the fuel cell of Pearson modified by Mufford and Wheat in the hybrid vehicle of Iwasaki for the benefit of providing power in a hybrid vehicle.

Response to Arguments

Applicant's arguments filed 7/26/2010 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Lee whose telephone number is 571-272-8699. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cynthia Lee/
Examiner, Art Unit 1795